CLEAN AIR: THE DELHI EXPERIENCE

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Right To Clean Air Campaign

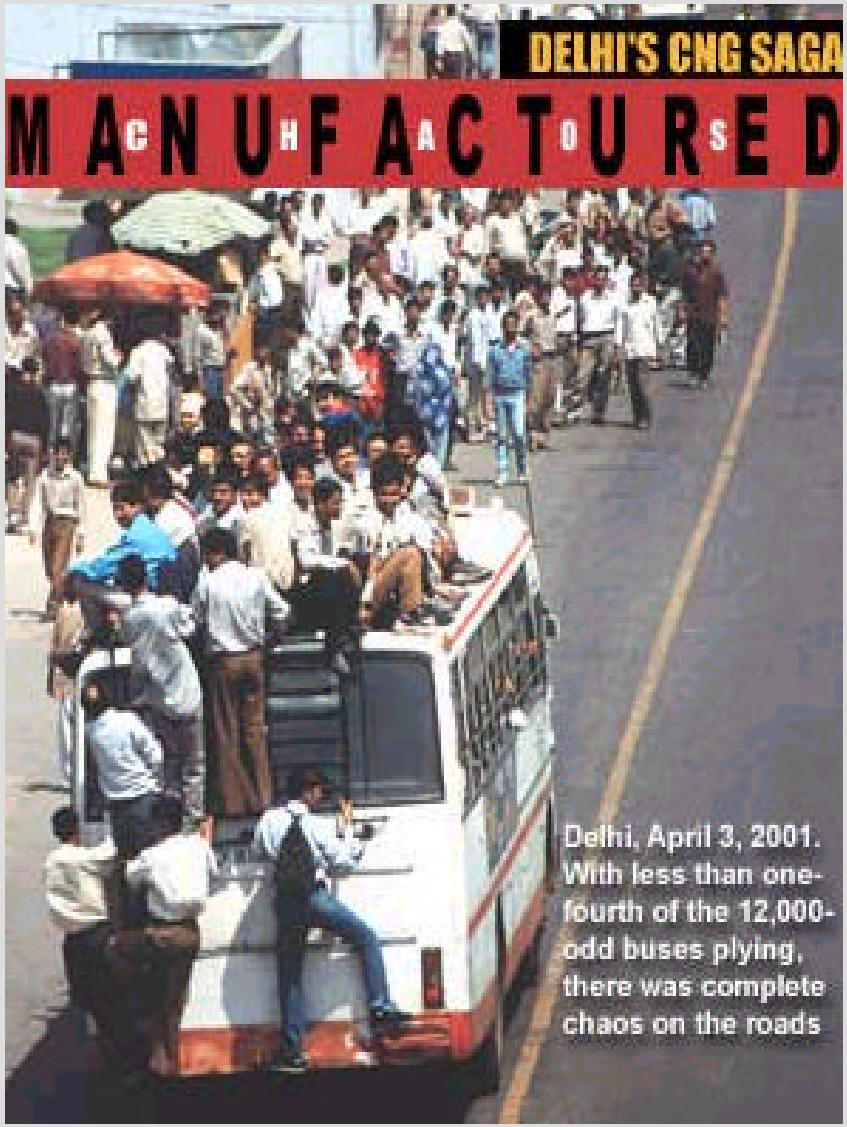
Centre for Science and Environment

8th National Clean Cities Conference

Oklahoma City

May 14, 2002

GENESIS



Why natural gas?

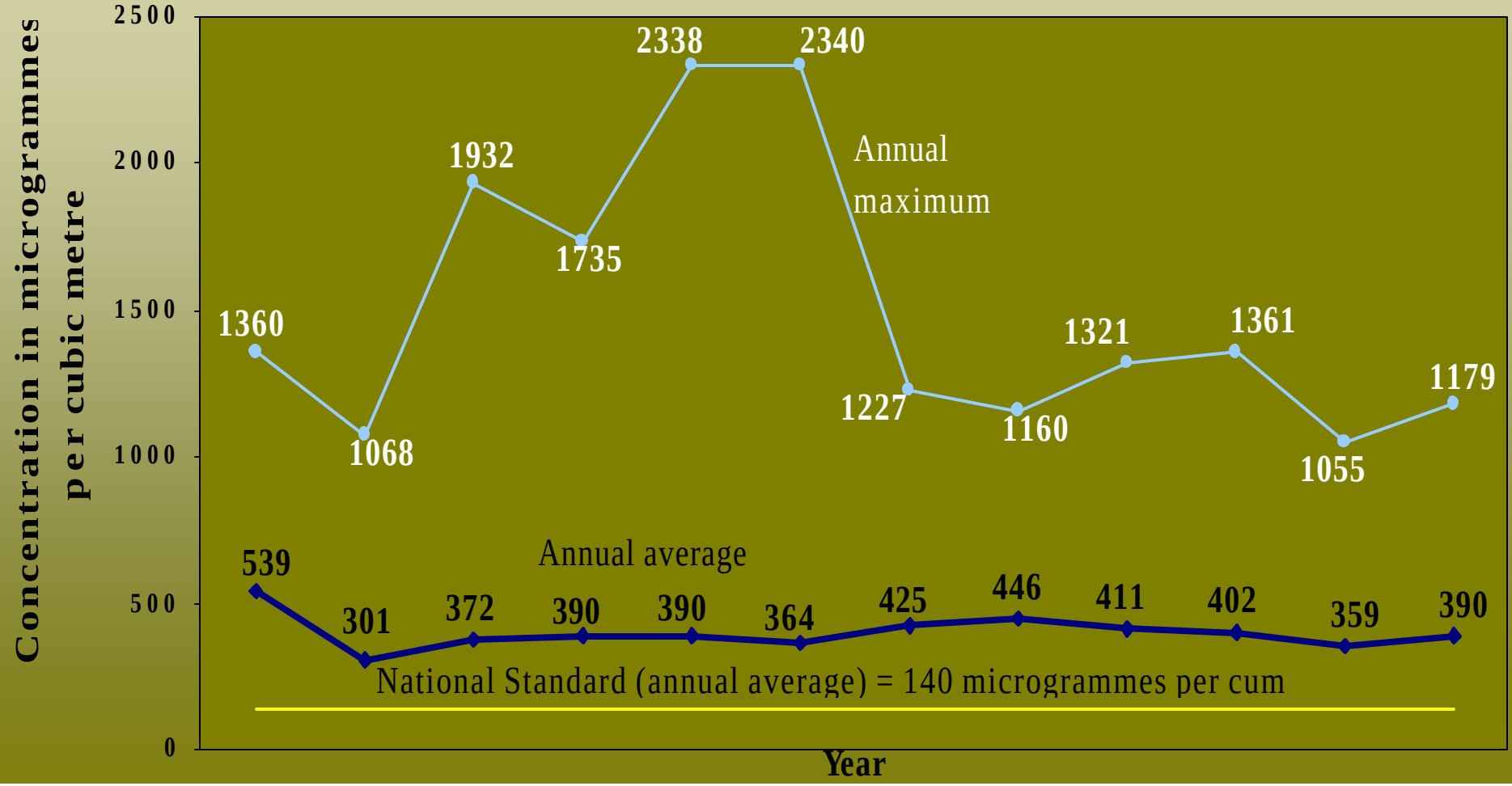
When did it start?

How is it going?

WHY NATURAL GAS?

Particulate pollution in Delhi: 1987-1998

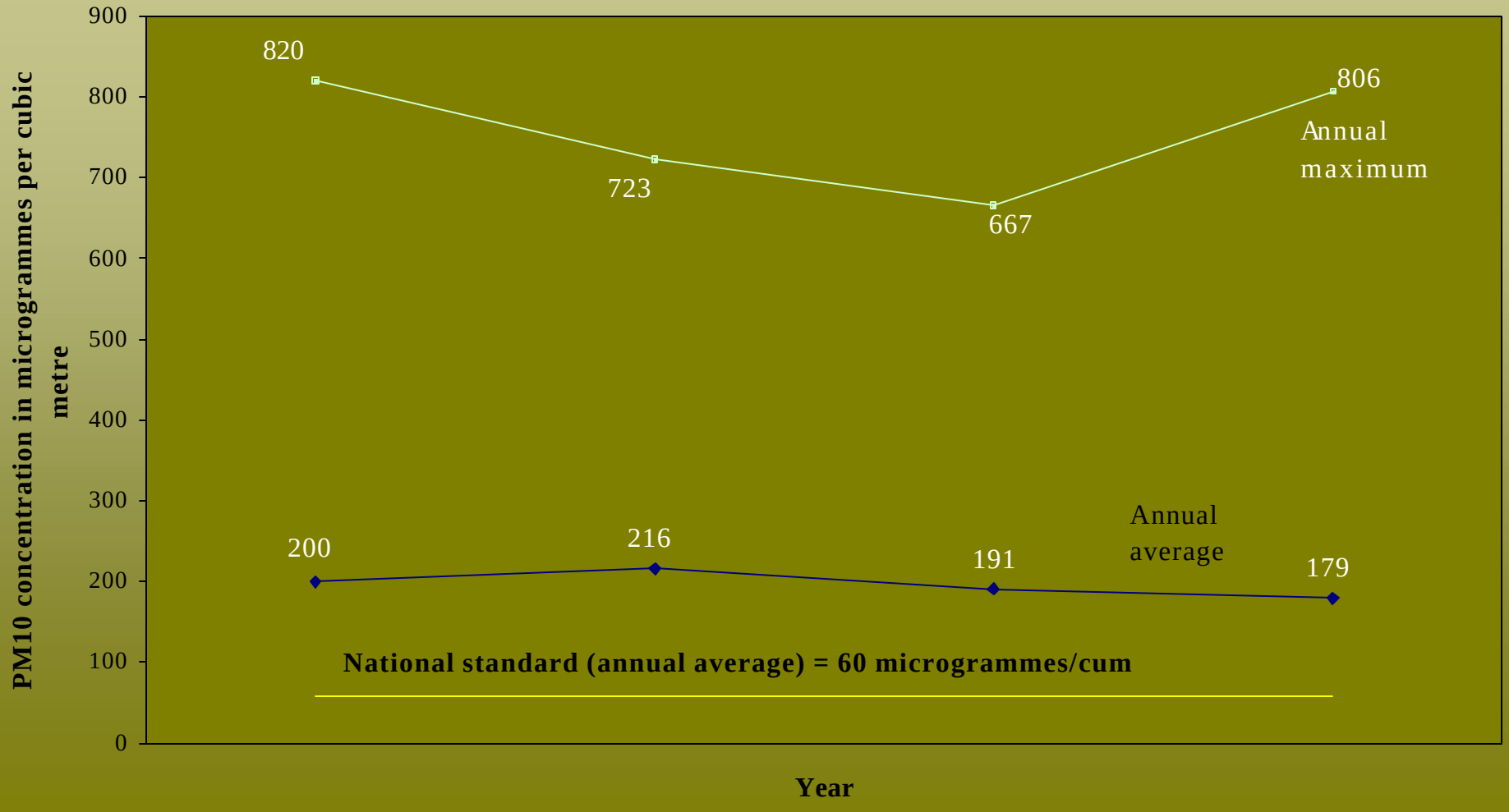
Levels of total suspended particulates are not only always above the standard, there are days when they reach 5-12 times the permissible limit



WHY NATURAL GAS?

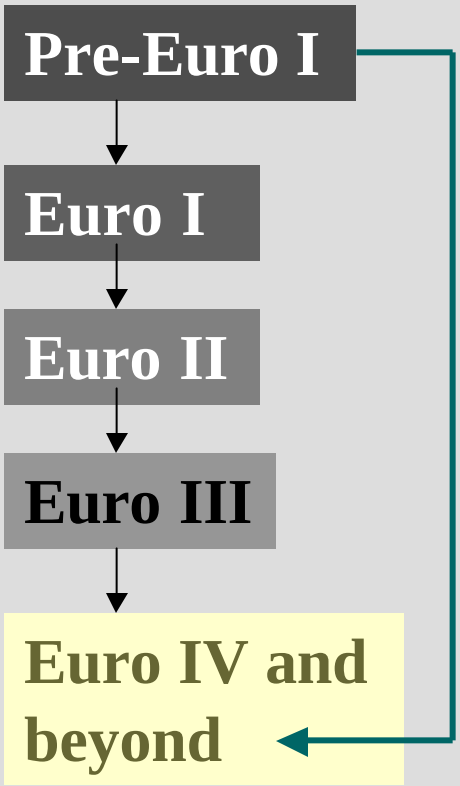
Particulate pollution: 1998-2001

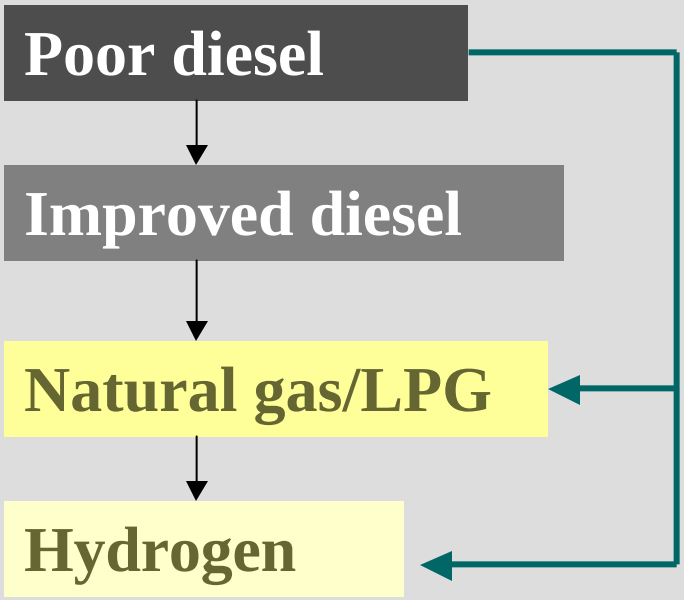
PM10 levels can go up as hight as 8 times the permissible limit. The increase in annual average levels have been arrested



WHY NATURAL GAS?

Do we have to go through the same stages of environmental management that the West went through, or can we leapfrog?





WHY NATURAL GAS?

Test results show that a stoichiometric CNG bus with a three-way catalyst is far ahead of a comparable diesel bus. It meets the Euro IV norms for both PM and NOx. Even carbon monoxide emission is better than Euro II norms

	Hydrocarbons	Oxides of nitrogen	Carbon monoxide	Particulate matter
Euro II	1.1	7.0	4.0	0.15
Euro III	0.66	5.0	2.10	0.10
Euro IV	0.46	3.5	1.50	0.02
Indian CNG bus (stoichiometric engine + three-way catalytic converter)	0.04 (non-methane hydrocarbon)	3.24	3.12	0.014

Note: All figures in grammes per kilowatt-hour

Source: R Ramakrishnan 2001, CNG – The Clean and Cost-effective Fuel for Delhi Vehicles, *mimeo*

GOVERNMENT INITIATIVES

- **1991:** Emission standards for vehicles. No limit on particulate emissions
- **1995:** Tailpipe emissions checking system – pollution under control certificate
- **1996:** Second set of emission standards: still no limit on particulate emissions
- **2001:** Approves liquefied petroleum gas (LPG) as automotive fuel; approves 5 per cent blend of ethanol in petrol

JUDICIARY: *THE PRIME MOVER*

- **1985:** Public interest litigation filed in Supreme Court (SC)
- **1985-1996:** SC orders introduction of unleaded fuel, conversion of government vehicles to CNG, catalytic converters on new cars, lower sulphur content of diesel
- **1996:** December: CSE publishes *Slow Murder*
- **1997:** SC reacts; asks government to file action plan to control air pollution; government issues white paper
- **1998:** SC appoints Environment Pollution (Prevention and Control) Authority [**EPCA**]
- **1998:** Directs to put buses, old taxis and 3-wheelers on CNG, phase out 15 year old commercial vehicles
- **1999:** Advances emission standards by five years, lower sulphur in diesel and petrol to 500ppm

EPCA: THE CNG STRATEGY

- "Effects of these *(previous)* measures on ambient air quality is limited due to pollution from old in-use vehicles and quantum increase in new vehicles."

- "EPCA has drawn a plan of action than can reduce air pollution over the next two years."

- "The need to list them down separately arises from the lack of action on those *(previous)* plans by implementing departments and the need to focus on effective measures in order to have an impact in the short-term."

EPCA: THE CNG STRATEGY

- **Short-term action plan (1998):**

  For immediate impact

- Replacement of all pre-1990 3-wheelers and taxis with new vehicles using clean fuel by March 2000

- Replacement, with financial incentives, of post-1990 3-wheelers and taxis with new vehicles using clean fuel by March 2001

- Entire city bus fleet to be steadily converted to single fuel mode on CNG by March 2001

KEY PLAYERS

- ***Various agencies involved in implementation***

Supreme Court

Reports to SC, recommends future action

EPCA — Monitors progress →

Technical and research inputs

Civil Society Organisations

Research Institutes

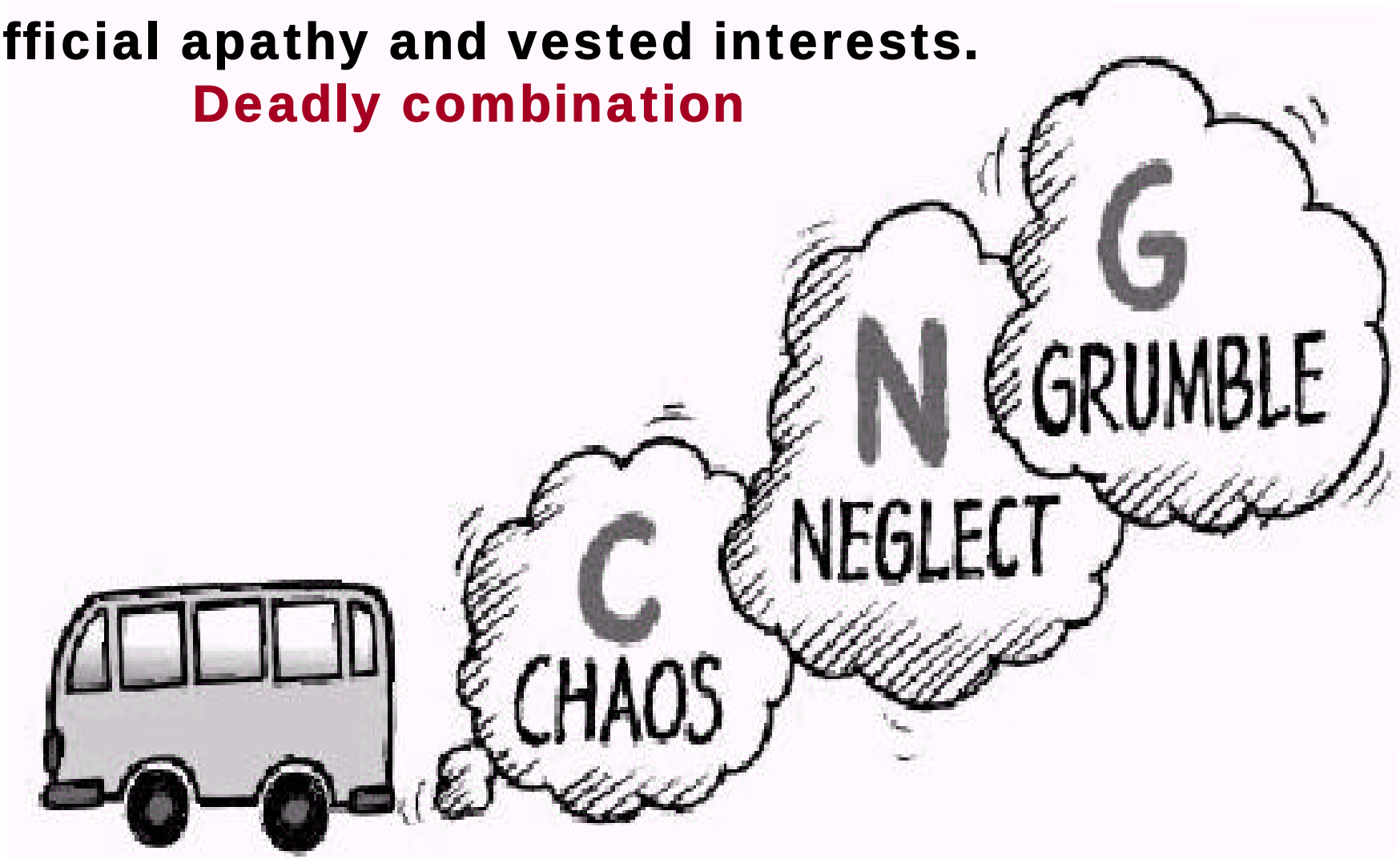
Responsible for implementation

- Delhi Government
- Indraprastha Gas Ltd
- Automobile Industry
- Transporters
- Ministry of Road Transport and Highways
- Ministry of Petroleum and Natural Gas
- Ministry of Environment and Forests

GOVERNMENT: THE CNG STRATEGY

Official apathy and vested interests.

Deadly combination



EXCUSES

- **INDRAPRASTHA GAS LTD:** Lack of land, electricity, boosters

  RESULT: **Fail to set up required number of dispensing units, long queues**

- **MINISTRY OF PETROLEUM:** Enough gas not available

  RESULT: **Rising demand, refusal to supply**

- **MINISTRY OF ROAD TRANSPORT:** CNG technology not viable

  RESULT: **Take three years to set outdated emission and safety standards**

- **DELHI GOVERNMENT:** Lack of CNG buses; buses not safe

  RESULT: **Fail to meet deadline, four times**

PROPAGATING MYTHS

- **MYTH:** Low sulphur and ultra low sulphur diesel are better than CNG
- **MYTH:** There is not enough CNG
- **MYTH:** CNG vehicles are not safe
- **MYTH:** CNG vehicles emit more ultrafine particles
- **MYTH:** Natural gas pipeline can burst any day; the city will come to a halt
- **MYTH:** Use of CNG leads to global warming

SABOTAGE: DESPERATE ATTEMPTS

- **AUGUST 2001:** Government sets up a committee to recommend auto fuel policy
- **JANUARY 2002:** Committee recommends Euro II diesel for Delhi (which is already in place), and Euro III from 2003; government accepts the interim report
- **APRIL 5, 2002:** SC comes down heavily on the government and the committee's report; stands firm on its earlier orders; imposes fines on government and diesel bus operators
- ***Government talks of overruling the order by an ordinance: goes back under public pressure, but increases price of CNG***

ISSUES TO BE SORTED OUT

- **LEVEL OF TECHNOLOGY**
- **EMISSION STANDARDS**
- **SAFETY STANDARDS**
- **ALLOCATION OF GAS**
- **DISPENSING STATIONS**
- **PRICING POLICY**

TECHNOLOGY AND EMISSIONS

- **CURRENT TECHNOLOGY:** Closed-loop, stoichiometric engine with three-way catalytic converters designed for natural gas use.

  FUTURE ACTION: Fully-electronic fuel injection and ignition control systems
- **CONVERSION TECHNOLOGY:** Approaches proposed to conversion of existing buses to CNG vary greatly in quality.

  FUTURE ACTION: Set stringent norms and provide for periodic inspection of converted buses
- **EMISSIONS:** The potential exists for further reduction in emissions through technological improvement that could be implemented over the next few years.

  FUTURE ACTION: Set more stringent emission standards.

SAFETY STANDARDS

- Improvement required in areas such as material of the high-pressure piping, fixing of pipes to the chassis, tightening of the couplings, venting of the pressure relief valve, and inspection of gas pipes.
- Problem of leakage
- Location of pressure relief valve (to vent the gas if the cylinder is exposed to high temperatures and/or high internal pressure).

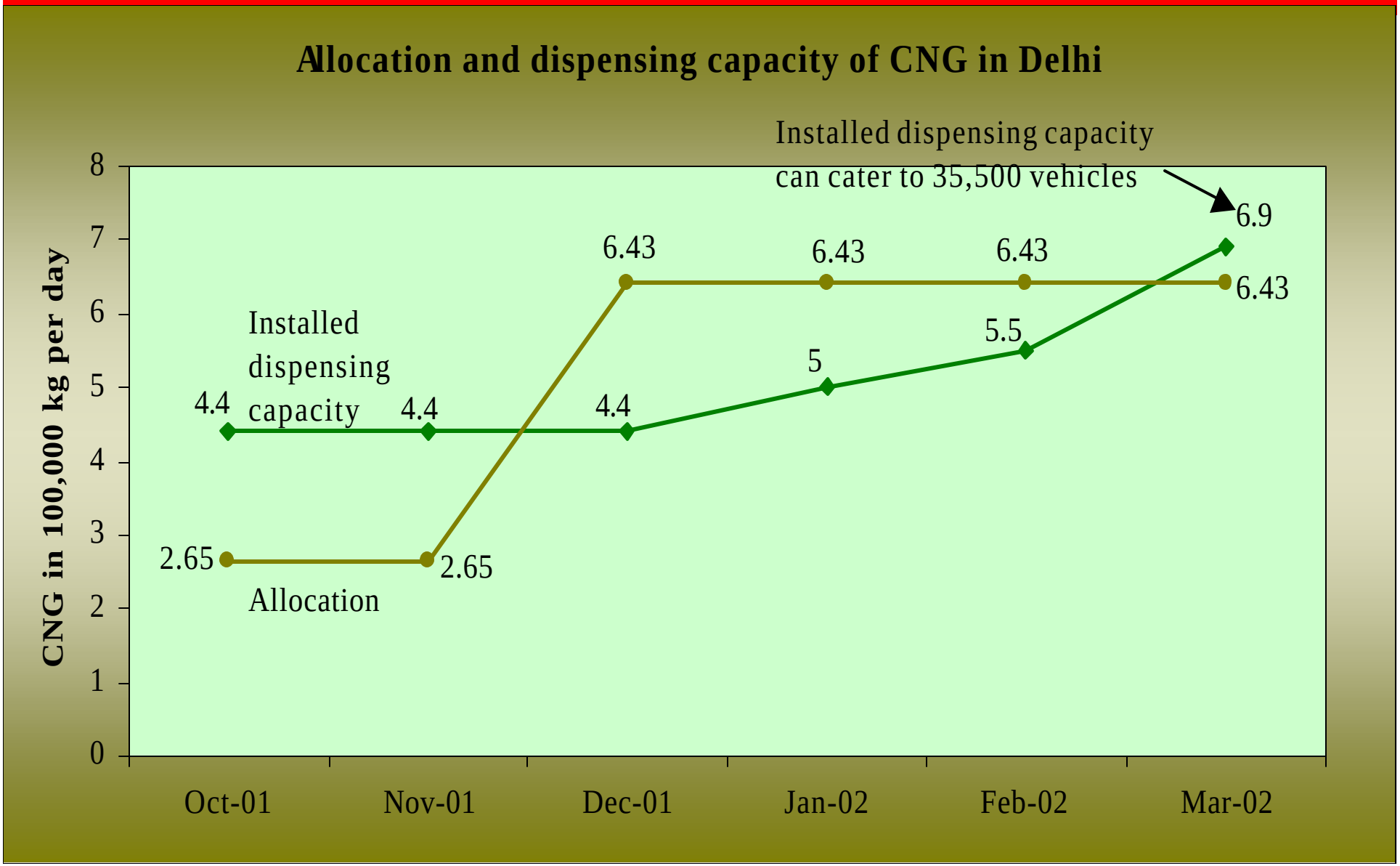
ALLOCATION OF GAS

- Present allocation of natural gas to Delhi – 0.98 mcum
- Projected demand by June 2002 – 2 mcum
- Total production of natural gas in India in 2000 – 22,148 mcum

SC says –

- *"The plea of the Government that CNG is in short supply, and that it is unable to supply adequate quantity is incorrect, and this is clearly a deliberate attempt to frustrate the orders passed by this Court."*
- *"The Union of India will give priority to transport sector including private vehicles all over India with regard to the allocation of CNG."*

ALLOCATION OF GAS



DISPENSING STATIONS

- More than 90 dispensing stations at present. Lack of adequate compression capacity
- Initial problems with refueling nozzles solved
- Uniform distribution of stations across the city

PRICING POLICY

MOCKERY OF 'POLLUTER PAYS' PRINCIPLE

- Prices of fuels controlled by government
- To begin with, CNG was cheapest, cheaper than diesel, which in turn is cheaper than petrol
- Price of CNG increased thrice in two years making it costlier than diesel
- This takes away the financial advantage of natural gas
- Highly inadequate financial incentive to manufacturers or consumers to shift to alternative fuels

ACTION AGENDA

ELEMENTS OF A SUCCESS STORY

- Set **stringent emissions standards** for vehicles on alternative fuels, whether new or converted
- Set **safety standards**
- **Allocate adequate** natural gas for vehicles
- Formulate **fiscal incentives** to encourage all categories of vehicles to shift to alternative fuels.